and the chord FE passes through P; and so for any circle. Q. E. D.

This problem was also solved by *G. B. M. Zerr, John B. Faught, J. F. W. Scheffer*, and *O. W. Anthony*.

PROBLEMS.

37. Proposed by B. F. BURLESON, Oneida Castle, New York.

Inscribe in a semicircle a rectangle having a given area; a rectangle having the maximum area.

38. Proposed by LEONARD E. DICKSON, M. A., Fellow in Mathematics, University of Chicago.

Give a *strictly geometric* proof of my fundamental theorem on the Inscription of Regular Polygons, viz: Suppose a circle of unit radius divided at the points $A, A_1, A_2, A_3, \dots A_p, \dots$ into $2p+1$ equal parts and the diameter AO drawn. Then, if the chords $OA_1, OA_2, \dots OA_p$ be drawn, we have $OA_1 - OA_2 + OA_3 - OA_4 + OA_5 - \dots \pm OA_p = 1$.

CALCULUS.

Conducted by J. M. COLAW, Monterey, Va. All contributions to this department should be sent to him.

SOLUTIONS OF PROBLEMS.

25. Proposed by F. P. MATZ, M. Sc., Ph. D., Professor of Mathematics and Astronomy in New Windsor College, New Windsor, Maryland.

A leaf of the curve: "The Devil on Two Sticks", equation $y^4 - x^4 + 100a^2x^2 - 96a^2y^2 = 0$, revolves around the axis of x. Deduce the expression for the volume generated.

I. Solution by the PROPOSER.

From the equation of the given curve, we deduce $y^2 = 48a^2 \pm \sqrt{(2304a^4 - 100a^2x^2 + x^4)}\dots(1)$; that is, $(PD)^2 = 48a^2 + \sqrt{(2304a^4 - 100a^2x^2 + x^4)}$, and, therefore, $(P'D)^2 = 48a^2 - \sqrt{(2304a^4 - 100a^2x^2 + x^4)}$. Hence the expression for the volume generated after the curve has made a complete revolution around the axis of x, becomes

$$V = 2\pi\left[\int_0^{6a}[48a^2 + \sqrt{(2304a^4 - 100a^2x^2 + x^4)}]dx - \int_0^{6a}[48a^2 - \sqrt{(2304a^4 - 100a^2x^2 + x^4)}]dx\right]\dots(2).$$